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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,414	03/26/2004	Isao Amemiya	02887.0272	6813

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EXAMINER

GOLDBERG, BRIAN J

ART UNIT PAPER NUMBER

2861

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Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/809,414	AMEMIYA, ISAO	
	<b>Examiner</b>	<b>Art Unit</b>	
	Brian Goldberg	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 3/26/04
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/26/04, 10/14/05</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 2, 3, 6, 7, 13, 15, 16, and 20 are objected to because of the following informalities:  
informalities:
2. Regarding claims 2 and 15, the claimed limitation "the sub transducers" lacks proper antecedent basis because it is only previously referred to as "at least one".
3. Regarding claim 3, "a concave lens spherical aberration of which has been corrected" is not clear. A suggested correction would be "a concave lens, a spherical aberration of which has been corrected,".
4. Regarding claim 6, the claimed limitation "the droplet recovery surfaces" lacks proper antecedent basis because it is only previously referred to in the singular.
5. Regarding claim 7, the claimed limitation "the hit droplets" lacks sufficient antecedent basis in the claim.
6. Regarding claim 13, the claimed limitation "the acoustic wave focusing member" lacks proper antecedent basis because it is only previously referred to as "the acoustic focusing member".
7. Regarding claim 16, "is provided in a such manner" should be "is provided in such a manner". Appropriate correction is required.
8. Regarding claim 20, the claim is not in the appropriate form for a method claim. A suggested correction would be: "A method of ejecting and recovering a printing liquid comprising the steps of focusing...wherein the step of ejecting droplets of the printing liquid includes ejecting the droplets in a straight manner..."

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-11, 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirahara et al. (US 6045208) in view of Delametter et al. (US 6497510).

11. Regarding claim 1, Hirahara et al. disclose "a printing liquid containing chamber (15) containing the printing liquid (18); a piezoelectric element (10) including a main transducer (14) and at least one sub transducer (14<sub>1,2,3...</sub>) located on at least one side of the main transducer, and generating the acoustic wave by receiving a signal (21); and an acoustic focusing member (16) focusing the acoustic wave generated by the piezoelectric element near the surface of the printing liquid, thereby ejecting the droplets of the printing liquid (19)." Thus Hirahara et al. meet the claimed invention except "switching between a first ejection mode in which the droplets are ejected in a first direction perpendicular to a liquid surface in the printing liquid containing chamber and a second ejection mode in which the droplets are ejected at an angle to the first direction by applying or not applying a drive signal to the sub transducer."

12. Delametter et al. teach "switching between a first ejection mode in which the droplets are ejected in a first direction perpendicular to a liquid surface in the printing liquid containing chamber (see droplet 12) and a second ejection mode in which the droplets are ejected at an angle to the first direction (see droplets 11a and 11b) by

applying or not applying a drive signal to the sub transducer (2a, 2a')." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to apply the ejection modes with deflected droplets taught by Delametter et al. to the apparatus discloses by Hirahara et al. One would have been motivated to so modify Hirahara et al. for the benefit of deflecting unwanted droplets and conserving ink by collecting the deflected droplets.

13. Regarding claim 2, Hirahara et al. further disclose "wherein the sub transducers (14<sub>1,2,3...</sub>) are provided at both sides of the main transducer (14)."

14. Regarding claim 3, Hirahara et al. further disclose "wherein the acoustic focusing member is either a concave lens spherical aberration of which has been corrected or a Fresnel lens (16, col 21 ln 19)."

15. Regarding claim 4, Delametter et al. further disclose "a droplet recovery member (9, shown in Figs 4, 4A, 5) provided so as to face toward the surface of the printing liquid, and having an opening, through which some of the ejected droplets pass (droplet 12), and a droplet recovery surface facing toward the surface of the printing liquid, the ejected droplets that do not pass through the opening (11a, 11b) hitting the droplet recovery surface, thereby directly or indirectly returning to the printing liquid containing chamber (see Figs 4, 4A, 5)."

16. Regarding claim 5, Delametter et al. further disclose "the droplet recovery surface is located on at least one side of the opening of the droplet recovery member (see Figs 4, 4A, 5)."

17. Regarding claim 6, Delametter et al. further disclose "the droplet recovery surfaces are located on both sides of the opening of the droplet recovery member (see Figs 4, 4A, 5)."

18. Regarding claim 7, Delametter et al. further disclose "the droplet recovery surface serves as a surface which the droplets hit and along which the hit droplets flow in accordance with the force of gravity so as to be recovered (see Figs 4, 4A, 5, where the droplets hit the vertical slanted wall and descend by gravity)."

19. Regarding claim 8, Hirahara et al. further disclose "a drive signal generating circuit (21) generating the drive signal to be applied to the piezoelectric element."

20. Regarding claim 9, Hirahara et al. further disclose "the drive signal generating circuit (21) is capable of applying or not applying the drive signal to the sub transducer in accordance with at least the image printing data signal externally applied thereto, while the drive signal is being applied to the main transducer (col 56 ln 27-45)."

21. Regarding claim 10, Hirahara et al. further disclose "centers of the main transducer and the acoustic focusing member are shifted from each other (see Fig 2B)."

22. Regarding claim 11, Delametter et al. further disclose "a partition wall is provided inside the droplet recovery surface (see Figs 4, 4A, 5 where the vertical slanted wall serves as a partition wall)."

23. Regarding claim 13, Hirahara et al. further disclose "the acoustic wave focusing member (16) is provided in a manner to eject the droplets downward in a vertical direction (see Fig 3 where the droplets are ejected vertically downward if the image is rotated so the top of the page is the bottom)" and Delametter et al. further disclose "the

droplet recovery surface is provided so as to face upward on at least one side of the opening (see Figs 4, 4A, 5 where the horizontal portion faces upward)."

24. Regarding claim 14, Hirahara et al. further disclose "centers of the main transducer and the acoustic focusing member coincide with each other (see Fig 7, as an example) and the sub transducer is provided at one side of the main transducer (see Fig 8, as an example)."

25. Regarding claim 15, Hirahara et al. further disclose "a plurality of the sub transducers are provided on at least one side of the main transducer (see Fig 2b or Fig 8)."

26. Regarding claim 16, Hirahara et al. further disclose "the acoustic focusing member is provided in a such manner that the acoustic waves are emitted diagonally relative to a direction of the ejected droplets (see Fig 2b where the diagonal arrows show diagonal waves)."

27. Regarding claim 17, Hirahara et al. further disclose "the piezoelectric element generates an ultrasound wave (In 6 of abstract)."

28. Regarding claim 18, Hirahara et al. in view of Delametter et al. disclose the claimed invention as set forth above with respect to claim 1. It would be obvious to duplicate the printing liquid ejecting units discloses in claim 1 (*In re Harza*, 274 F.2d 669, 671, 124 USPQ 378, 380 (CCPA 1960)).

29. Regarding claim 19, Hirahara et al. further disclose "the piezoelectric element generates an ultrasound wave (In 6 of abstract)."

30. Regarding claim 20, Hirahara et al. in view of Delametter et al. disclose the method in accordance with the apparatus of claim 1. Hirahara et al. disclose a method of ejecting...a printing liquid by focusing acoustic waves generated by a transducers (10), ejecting droplets of the printing liquid contained in a printing liquid containing chamber from a surface thereof by means of a sound pressure of the acoustic wave (see Figs 2 and 3). Delametter et al. disclose recovering a printing liquid wherein the droplets are ejected in a straight manner (12) so as to pass through an opening of a droplet recovery member by applying or not applying a drive signal to a sub transducer...and the droplets are ejected in a deflecting manner (11a, 11b) so as to hit a droplet recovery surface of the droplet recovery member (9).

31. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirahara et al. in view of Delametter et al. and further in view of Jeanmaire (US 6866370).

Hirahara et al. in view of Delametter et al. disclose the claimed invention as set forth above with respect to claim 4. Thus Hirahara et al. in view of Delametter et al. meet the claimed invention except "to eject the droplets in a horizontal direction, and the droplet recovery surface is provided at lest below the opening."

32. Jeanmaire teaches "to eject the droplets in a horizontal direction, and the droplet recovery surface is provided at lest below the opening (see Fig 3a)." It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to eject the droplets horizontally while the recovery surface is below the opening. One would have been motivated to so modify Hirahara et al. in view of Delametter et al. for



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the benefit of being able to eject droplets horizontally instead of only vertically without sacrificing the objective of the apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Goldberg whose telephone number is 571-272-2728. The examiner can normally be reached on Monday through Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJG

February 28, 2006



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